WHAT IS CLAIMED IS:

1. A crystallization apparatus comprising: a mask; and an illumination system which illuminates the mask with a light beam, the light beam from the illumination system becoming a light beam having a light intensity distribution with an inverse peak pattern when transmitted through the mask, and irradiating a polycrystal semiconductor film or an amorphous semiconductor film, thereby generating a crystallized semiconductor film,

the mask including a light absorption layer having light absorption characteristics according to the light intensity distribution with the inverse peak pattern.

2. A crystallization apparatus comprising: a mask; and an illumination system which illuminates the mask with a light beam, the light beam from the illumination system becoming a light beam having a light intensity distribution with an inverse peak pattern when transmitted through the mask and being incident onto, a polycrystal semiconductor film or an amorphous semiconductor film, thereby generating a crystallized semiconductor film,

the mask including a light scattering layer having light scattering characteristics according to the light intensity distribution with the inverse peak pattern.

3. The crystallization apparatus according to claim 2, wherein the light scattering layer has

a refractive index distribution according to the light intensity distribution with the inverse peak pattern.

4. The crystallization apparatus according to claim 3, wherein the light scattering layer is formed by forming a layer consisting of a transparent material in which volatile components are dispersed and then volatilizing the volatile components.

5. The crystallization apparatus according to claim 2, wherein the light scattering layer has a surface shape according to the light intensity distribution with the inverse peak pattern.

6. A crystallization apparatus comprising: a mask; and an illumination system which illuminates the mask with a light beam, the light beam from the illumination system becoming a light beam having a light intensity distribution with an inverse peak pattern when transmitted through the mask, and irradiating a polycrystal semiconductor film or an amorphous semiconductor film, thereby generating a crystallized semiconductor film,

the mask including a light reflection layer having light reflection characteristics according to the light intensity distribution with the inverse peak pattern.

7. The crystallization apparatus according to claim 6, wherein the light reflection layer has a multilayer reflection film formed in accordance with a predetermined layer number distribution.

8. The crystallization apparatus according to claim 6, wherein the light reflection layer has a metal reflection film formed in accordance with a predetermined thickness distribution.

9. A crystallization apparatus comprising: a mask; and an illumination system which illuminates the mask with a light beam, the light beam from the illumination system becoming a light beam having a light intensity distribution with an inverse peak pattern when transmitted through the mask, and irradiating a polycrystal semiconductor film or an amorphous semiconductor film, thereby generating a crystallized semiconductor film,

the mask including a light refraction layer having light refraction characteristics according to the light intensity distribution with the inverse peak pattern.

10. The crystallization apparatus according to claim 9, wherein the light refraction layer has a refractive index distribution according to the light intensity distribution with the inverse peak pattern.

11. The crystallization apparatus according to claim 9, wherein the light refraction layer has a surface shape according to a light intensity distribution with the inverse peak pattern.

12. A crystallization apparatus comprising: a mask; and an illumination system which illuminates the mask with a light beam, the light beam from the

illumination system becoming a light beam having a light intensity distribution with an inverse peak pattern when transmitted through the mask, and irradiating a polycrystal semiconductor film or an amorphous semiconductor film, thereby generating a crystallized semiconductor film,

the mask including a light diffraction layer having light diffraction characteristics according to the light intensity distribution with the inverse peak pattern.

13. The crystallization apparatus according to claim 12, wherein the light diffraction layer has a refractive index distribution according to the light intensity distribution with the inverse peak pattern.

14. The crystallization apparatus according to claim 12, wherein the light diffraction layer has a surface shape according to the light intensity distribution with the inverse peak pattern.

15. A crystallization apparatus comprising: masks; and an illumination system which illuminates the mask with a light beam, the light beam from the illumination system becoming a light beam having a light intensity distribution with an inverse peak pattern when transmitted through the mask, and irradiating a polycrystal semiconductor film or an amorphous semiconductor film, thereby generating a crystallized semiconductor film,

each of the masks including a first layer and a second layer which are selected from a light absorption layer having light absorption characteristics according to the light intensity distribution with the inverse peak pattern, a light scattering layer having light scattering characteristics according to the light intensity distribution with the inverse peak pattern, a light reflection layer having light reflection characteristics according to the light intensity distribution with the inverse peak pattern, a light refraction layer having light refraction characteristics according to the light intensity distribution with the inverse peak pattern, and a light diffraction layer having light diffraction characteristics according to the light intensity distribution with the inverse peak pattern.

16. A crystallization apparatus comprising: a mask; and an illumination system which illuminates the mask with a light beam, the light beam from the illumination system becoming a light beam having a light intensity distribution with an inverse peak pattern when transmitted through the mask, and irradiating a polycrystal semiconductor film or an amorphous semiconductor film, thereby generating a crystallized semiconductor film,

the mask comprises a phase shift layer and a first

layer which is selected from a light absorption layer having light absorption characteristics according to the light intensity distribution with the inverse peak pattern, a light scattering layer having light scattering characteristics according to the light intensity distribution with the inverse peak pattern, a light reflection layer having light reflection characteristics according to the light intensity distribution with the inverse peak pattern, a light refraction layer having light refraction characteristics according to the light intensity distribution with the inverse peak pattern, and a light diffraction layer having light diffraction characteristics according to the light intensity distribution with the inverse peak pattern.

17. The crystallization apparatus according to claim 1, wherein the polycrystal semiconductor film or the amorphous semiconductor film and the mask are arranged so as to be appressed against each other.

18. The crystallization apparatus according to claim 1, wherein the polycrystal semiconductor film or the amorphous semiconductor film and the mask are arranged in substantially parallel to and in close proximity to each other.

19. The crystallization apparatus according to claim 1, further comprising an image forming optical system which is arranged in a light path between the

polycrystal semiconductor film or the amorphous semiconductor film and the mask, and

wherein the polycrystal semiconductor film or the amorphous semiconductor film is set so as to be separated from a plane which is optically conjugate with the mask by a predetermined distance on an optical axis of the image forming optical system.

20. The crystallization apparatus according to claim 1, further comprising an image forming optical system which is arranged in a light path between the polycrystal semiconductor film or the amorphous semiconductor film and the mask, and

wherein the polycrystal semiconductor film or the amorphous semiconductor film is set to a plane which is optically substantially conjugate with the mask, and

an image side numerical aperture of the image forming optical system is set to a value required to generate the light intensity distribution with the inverse peak pattern.

21. A crystallization apparatus comprising: a mask; and an illumination system which illuminates the mask with a light beam, the light beam from the illumination system becoming a light beam having a light intensity distribution with an inverse peak pattern when transmitted through the mask, and irradiating a polycrystal semiconductor film or an amorphous semiconductor film, thereby generating

a crystallized semiconductor film,

the mask having binary distribution characteristics according to the light intensity distribution with the inverse peak pattern, and being configured to obtain a relatively continuous light intensity distribution by removing a high-frequency component of a spatial frequency.

22. The crystallization apparatus according to claim 21, wherein the polycrystal semiconductor film or the amorphous semiconductor film and the mask are arranged in substantially parallel to and in close proximity to each other in order to remove the high-frequency component.

23. The crystallization apparatus according to claim 21, further comprising an image forming optical system arranged in a light path between the polycrystal semiconductor film or the amorphous semiconductor film and the mask, and

wherein the polycrystal semiconductor film or the amorphous semiconductor film is set so as to be separated from a plane which is optically conjugate with the mask by a predetermined distance on an optical axis of the image forming optical system in order to remove the high-frequency component.

24. The crystallization apparatus according to claim 22, wherein the illumination system illuminates the mask with a light beam having a predetermined

maximum incident angle.

25. The crystallization apparatus according to claim 21, further comprising an image forming optical system arranged in a light path between the polycrystal semiconductor film or the amorphous semiconductor film and the mask, and

wherein the polycrystal semiconductor film or the amorphous semiconductor film is set to a plane which is optically substantially conjugate with the mask, and

the image forming optical system is set to an image side numerical aperture required to remove the high-frequency component.

26. The crystallization apparatus according to claim 21, further comprising an image forming optical system arranged in a light path between the polycrystal semiconductor film or the amorphous semiconductor film and the mask, and

wherein the image forming optical system has an aberration required to remove the high-frequency component.

27. A crystallization method which illuminates a mask, and irradiates a polycrystal semiconductor film or an amorphous semiconductor film with a light beam having a light intensity distribution with an inverse peak pattern through the mask, thereby generating a crystallized semiconductor film,

the method using the mask including a light

absorption layer having light absorption characteristics according to the light intensity distribution with the inverse peak pattern.

28. A crystallization method which illuminates a mask, and irradiates a polycrystal semiconductor film or an amorphous semiconductor film with a light beam having a light intensity distribution with an inverse peak pattern through the mask, thereby generating a crystallized semiconductor film,

the method using the mask including a light scattering layer having light scattering characteristics according to the light intensity distribution with the inverse peak pattern.

29. A crystallization method which illuminates a mask, and irradiates a polycrystal semiconductor film or an amorphous semiconductor film with a light ray having a light intensity distribution with an inverse peak pattern through the mask, thereby generating a crystallized semiconductor film,

the method using the mask including a light reflection layer having light reflection characteristics according to the light intensity distribution with the inverse peak pattern.

30. A crystallization method which illuminates a mask, and irradiates a polycrystal semiconductor film or an amorphous semiconductor film with a light beam having a light intensity distribution with an inverse

peak pattern through the mask, thereby generating a crystallized semiconductor film,

the method using the mask including a light refraction layer having light refraction characteristics according to the light intensity distribution with the inverse peak pattern.

31. A crystallization method which illuminates a mask, and irradiates a polycrystal semiconductor film or an amorphous semiconductor film with a light beam having a light intensity distribution with an inverse peak pattern through the mask, thereby generating a crystallized semiconductor film,

the method using the mask including a light diffraction layer having light diffraction characteristics according to the light intensity distribution with the inverse peak pattern.

32. A crystallization method which illuminates a mask, and irradiates a polycrystal semiconductor film or an amorphous semiconductor film with a light beam having a light intensity distribution with an inverse peak pattern through the mask, thereby generating a crystallized semiconductor film,

the method using the mask including a first layer and a second layer respectively formed by layers selected from a light absorption layer having light absorption characteristics according to the light intensity distribution with the inverse peak pattern,

a light scattering layer having light scattering characteristics according to the light intensity distribution with the inverse peak pattern, a light reflection layer having light reflection characteristics according to the light intensity distribution with the inverse peak pattern, a light refraction layer having light refraction characteristics according to the light intensity distribution with the inverse peak pattern, and a light diffraction layer having light diffraction characteristics according to the light intensity distribution with the inverse peak pattern.

33. A crystallization method which illuminates a mask, and irradiates a polycrystal semiconductor film or an amorphous semiconductor film with a light beam having a light intensity distribution with an inverse peak pattern through the mask, thereby generating a crystallized semiconductor film,

the method using the mask including a phase shift layer and a first layer which is selected from a light absorption layer having light absorption characteristics according to the light intensity distribution with the inverse peak pattern, a light scattering layer having light scattering characteristics according to the light intensity distribution with the inverse peak pattern, a light reflection layer having light reflection

characteristics according to the light intensity distribution with the inverse peak pattern, a light refraction layer having light refraction characteristics according to the light intensity distribution with the inverse peak pattern, and a light diffraction layer having light diffraction characteristics according to the light intensity distribution with the inverse peak pattern.

34. A crystallization method which illuminates a mask, and irradiates a polycrystal semiconductor film or an amorphous semiconductor film with a light beam having a light intensity distribution with an inverse peak pattern through the mask, thereby generating a crystallized semiconductor film,

wherein a relatively continuous light intensity distribution is obtained by removing a high-frequency component of a spatial frequency by using the mask having binary distribution characteristics according to the light intensity distribution with the inverse peak pattern.

35. A mask used to form a predetermined light intensity distribution on a predetermined plane,

the mask comprising a light absorption layer having light absorption characteristics according to the predetermined light intensity distribution.

36. A mask used to form a predetermined light intensity distribution on a predetermined plane,

the mask comprising a light scattering layer having light scattering characteristics according to the predetermined light intensity distribution.

37. A mask used to form a predetermined light intensity distribution on a predetermined plane,

the mask comprising a light reflection layer having light reflection characteristics according to the predetermined light intensity distribution.

38. A mask used to form a predetermined light intensity distribution on a predetermined plane,

the mask comprising a light refraction layer having light refraction characteristics according to the predetermined light intensity distribution.

39. A mask used to form a predetermined light intensity distribution on a predetermined plane,

the mask comprising a light diffraction layer having light diffraction characteristics according to the predetermined light intensity distribution.

40. An exposure method comprising an illumination system which illuminates a mask defined in claim 35,

the method forming the predetermined light intensity distribution on a substrate that processing is applied to the predetermined plane.

41. The exposure method according to claim 40, wherein the substrate and the mask are arranged so as to be contact with each other.

42. The exposure method according to claim 40,

wherein the substrate and the mask are arranged in substantially parallel to and in close proximity to each other.

43. The exposure method according to claim 40, wherein an image forming optical system is arranged in a light path between the substrate and the mask, and the substrate is set so as to be separated from a plane which is optically conjugate with the mask by a predetermined distance on an optical axis of the image forming optical system.

44. The exposure method according to claim 40, wherein an image forming optical system is arranged in a light path between the substrate and the mask,

an image side numerical aperture of the image forming optical system is set to a value required to generate the predetermined light intensity distribution, and

the substrate is set to a surface which is optically substantially conjugate with the mask.